

Application of Elemental Sulfur Materials to Plant Foliage for Fungicide Effects

**Date
established**

April 2, 2003

Enclosure to

Enforcement Letter ENF 03-14

Distribution

County agricultural commissioners

Referrals

If you have any questions, please contact your liaison Senior Pesticide Use Specialist.

Introduction

This letter clarifies current Department of Pesticide Regulation (DPR) application of Food and Agricultural Code (FAC) sections 12811, 12995, and other provisions of the FAC to the use of elemental sulfur applied directly to plant leaves.

**DPR
interpretation
of elemental
sulfur materials**

DPR's interpretation of the law is that the application of elemental sulfur materials directly to or "over the top" of plants in leaf are presumed to be a pesticide (fungicide) use. Elemental sulfur products, with labeling that suggests this use, must be registered as a pesticide, regardless of the product's status as a registered fertilizing material with the California Department of Food and Agriculture. It is not necessary that the manufacturer make specific pesticide claims for the product; the pesticidal benefits and intent of this use are well known and understood.

Continued on next page

Application of Elemental Sulfur Materials to Plant Foliage for Fungicide Effects, Continued

DPR review of literature

DPR's scientific review of available literature indicates that plants take up and utilize sulfur in the sulfate form - SO_4 . Elemental sulfur must be oxidized to sulfate to be made available to the plant. This process takes place in the soil and is accomplished by soil microbes. Available references, including the *Western Fertilizer Handbook*, make no mention of plants using elemental sulfur directly, nor the conversion of elemental sulfur to sulfate in or on the plant itself. Thus, the application of elemental sulfur to foliage is not going to provide any significant amount of nutritionally available sulfur to the plant. The sulfur must go through the soil first.

On the other hand, sulfur applied to leaves has several direct pesticidal benefits for disease and mite control. Many registered sulfur pesticide product labels have a vast array of crops listed. The conclusion is that the only benefit gained from the foliar application of elemental sulfur is a pesticidal benefit, not a nutritional one.

Non-pesticide use of sulfur

Soil application is the appropriate method for use of elemental sulfur as a nutrient. This would be an acceptable non-pesticide use. Sulfur and sulfate also have soil amendment properties; e.g., lowering pH in alkaline soils and improving structure in sodic soils if applied with calcium, etc. Various mineral sulfate compounds can be applied as foliar fertilizers. This would be an available form of sulfur to the plant, with little to no pesticidal benefit.

Product labeling

When you encounter elemental sulfur products with labeling that includes foliar use, gather product labeling and any additional information you can obtain about how the product is marketed or presented to the grower. For example, reducing or substituting for applications of fungicides or other registered sulfur products, other "indirect" pesticidal benefits, timing of applications (e.g., starting applications early when canes are 6" - 8" long), technical bulletins, research results, other oral claims, etc. Product compliance (registration) issues should be forwarded to your Regional Office for follow-up action against the manufacturer and/or distributor. Action may be taken against growers who persist in this use violation pursuant to FAC section 12995.

Continued on next page

Application of Elemental Sulfur Materials to Plant Foliage for Fungicide Effects, Continued

Scientific literature questions

Questions concerning the scientific literature relative to plant use of elemental sulfur can be directed to Dr. Don Koehler of DPR's Pesticide Registration Branch at (916) 324-3950 or by e-mail to <dkoehler@cdpr.ca.gov>.

Pesticide regulatory program

The integrity of the pesticide regulatory program dictates that we not ignore this issue. While education and outreach to industry has a role, this use pattern should be given appropriate priority and integrated into your overall pesticide use enforcement program, recognizing that the worker safety and environmental hazards of elemental sulfur used in this manner are not dependent on its registration status.

If you see a need to make this a focused activity in your county, please discuss this with your liaison Senior Pesticide Use Specialist for the next negotiated workplan.
